

**Listing of Claims:**

1-19. (Canceled)

20. (Currently amended) At least one high-k device, comprising:

a structure having a strained substrate formed thereover[[:]], the strained substrate comprising at least an uppermost strained-Si epi layer having a dislocation density of strained-Si epi of less than about  $1\text{E}6/\text{cm}^2$ ;

at least one dielectric gate oxide portion over the strained substrate[[:]], the at least one dielectric gate oxide portion having a dielectric constant of greater than about 4.0; and

a device over each of the at least one dielectric gate oxide portion to complete the at least one high-k device.

21. (Original) The structure of claim 20, wherein the at least one dielectric gate oxide portion is comprised of  $\text{HfO}_2$ ,  $\text{HfSiO}_4$ , N-doped hafnium,  $\text{HfSiO}_x$ ,  $\text{ZrO}_2$ ,  $\text{ZrSiO}_x$  or N-doped zirconium silicate.

22. (Original) The device of claim 20, wherein the structure is a silicon substrate or a germanium substrate.

23. (Canceled)

24. (Original) The device of claim 20, wherein the strained substrate is comprised of only the uppermost strained-Si epi layer.

25. (Currently amended) [[The device of claim 20,]] At least one high-k device, comprising:

a structure having a strained substrate formed thereover, the strained substrate comprising only an uppermost strained-Si epi layer ~~wherein the strained substrate is comprised of only the uppermost strained-Si epi layer~~ having a thickness of from about 100 to  $500\text{\AA}$ ;

at least one dielectric gate oxide portion over the strained substrate, the at least one dielectric gate oxide portion having a dielectric constant of greater than about 4.0; and

a device over each of the at least one dielectric gate oxide portion to complete the at least one high-k device.

26. (Currently amended) The device of claim ~~[[20]]~~ 25, ~~wherein the strained substrate is comprised of only~~ the uppermost strained-Si epi layer having a thickness of from about 150 to 300Å.

27. (Currently amended) The device of claim ~~[[20]]~~ 25, ~~wherein the strained substrate is comprised of only~~ the uppermost strained-Si epi layer having a thickness of from about 200 to 300Å.

28. (Currently amended) ~~The device of claim 20,~~ At least one high-k device, comprising:  
a structure having a strained substrate formed thereover, the strained substrate comprising  
~~wherein the strained substrate is comprised of the~~ an uppermost strained-Si epi layer, a middle relaxed  $\text{Si}_{1-x}\text{Ge}_x$  layer and a lowermost graded  $\text{Si}_{1-y}\text{Ge}_y$  layer;  
at least one dielectric gate oxide portion over the strained substrate, the at least one dielectric gate oxide portion having a dielectric constant of greater than about 4.0; and  
a device over each of the at least one dielectric gate oxide portion to complete the at least one high-k device.

29. (Currently amended) The device of claim ~~[[20]]~~ 28, ~~wherein the strained substrate is comprised of the uppermost strained-Si epi layer, a middle relaxed  $\text{Si}_{1-x}\text{Ge}_x$  layer and a lowermost graded  $\text{Si}_{1-y}\text{Ge}_y$  layer;~~ the uppermost strained-Si epi layer having a thickness of from about 100 to 500Å; the middle relaxed  $\text{Si}_{1-x}\text{Ge}_x$  layer having a thickness of from about 1000 to 50,000Å; and the lowermost graded  $\text{Si}_{1-y}\text{Ge}_y$  layer having a thickness of from about 200 to 50,000Å.

30. (Currently amended) The device of claim ~~[[20]]~~ 28, ~~wherein the strained substrate is comprised of the uppermost strained-Si epi layer, a middle relaxed  $\text{Si}_{1-x}\text{Ge}_x$  layer where x is greater than 0 and less than about 0.50 and a lowermost graded  $\text{Si}_{1-y}\text{Ge}_y$  layer where y is 0 or about 0 proximate the structure and increases to about x proximate the middle relaxed  $\text{Si}_{1-x}\text{Ge}_x$  layer, wherein  $x \geq y$ .~~

31. (Currently amended) ~~The device of claim 20,~~ At least one high-k device, comprising:  
a structure having a strained substrate formed thereover, the strained substrate comprising  
~~wherein the strained substrate is comprised of the~~ an uppermost strained-Si epi layer, a  
middle  $\text{Si}_{1-x}\text{Ge}_x$  layer and a lower silicon oxide layer;  
at least one dielectric gate oxide portion over the strained substrate, the at least one  
dielectric gate oxide portion having a dielectric constant of greater than about 4.0; and  
a device over each of the at least one dielectric gate oxide portion to complete the at least  
one high-k device.

32. (Currently amended) The device of claim ~~[[20]]~~ 31, ~~wherein the strained substrate is~~  
~~comprised of the uppermost strained-Si epi layer, a middle  $\text{Si}_{1-x}\text{Ge}_x$  layer and a lower~~  
~~silicon oxide layer,~~ wherein the uppermost strained-Si epi layer has a thickness of from  
about 100 to 500Å, the middle  $\text{Si}_{1-x}\text{Ge}_x$  layer has a thickness of from about 700 to 1200Å  
and the lower silicon oxide layer has a thickness of from about 800 to 2000Å.

33. (Currently amended) ~~The device of claim 20,~~ At least one high-k device, comprising:  
a structure having a strained substrate formed thereover, the strained substrate comprising  
~~wherein the strained substrate is comprised of the~~ an uppermost strained-Si epi layer over  
an upper relaxed  $\text{Si}_{1-x}\text{Ge}_x$  layer over a graded  $\text{Si}_{1-y}\text{Ge}_y$  layer over an epi layer over a  
lowermost relaxed  $\text{Si}_{1-z}\text{Ge}_z$  layer~~[[;]]~~, wherein  $x \geq y \geq z$ ;  
at least one dielectric gate oxide portion over the strained substrate, the at least one  
dielectric gate oxide portion having a dielectric constant of greater than about 4.0; and  
a device over each of the at least one dielectric gate oxide portion to complete the at least  
one high-k device.

34. (Currently amended) The device of claim ~~[[20]]~~ 33, ~~wherein the strained substrate is~~  
~~comprised of the uppermost strained-Si epi layer over an upper relaxed  $\text{Si}_{1-x}\text{Ge}_x$  layer~~  
~~over a graded  $\text{Si}_{1-y}\text{Ge}_y$  layer over an epi layer over a lowermost relaxed  $\text{Si}_{1-z}\text{Ge}_z$  layer;~~  
the uppermost strained-Si epi layer having a thickness of from about 100 to 500Å; the  
upper relaxed  $\text{Si}_{1-x}\text{Ge}_x$  layer having a thickness of from about 1000 to 50,000Å; the  
graded  $\text{Si}_{1-y}\text{Ge}_y$  layer having a thickness of from about 2000 to 50,000Å~~[[,]]~~; the epi

layer having a thickness of from about 20 to 500Å; and the lowermost relaxed  $\text{Si}_{1-z}\text{Ge}_z$  layer having a thickness of from about 200 to 50,000 Å.

35. (Currently amended) The device of claim [[20]] 33, ~~wherein the strained substrate is comprised of the uppermost strained-Si epi layer over an upper relaxed  $\text{Si}_{1-x}\text{Ge}_x$  layer over a graded  $\text{Si}_{1-y}\text{Ge}_y$  layer over an epi layer over a lowermost relaxed  $\text{Si}_{1-z}\text{Ge}_z$  layer;~~ the uppermost strained-Si epi layer having a thickness of from about 150 to 300Å; the upper relaxed  $\text{Si}_{1-x}\text{Ge}_x$  layer having a thickness of from about 2000 to 40,000Å; the graded  $\text{Si}_{1-y}\text{Ge}_y$  layer having a thickness of from about 500 to 25,000Å; the epi layer having a thickness of from about 50 to 200Å; and the lowermost relaxed  $\text{Si}_{1-z}\text{Ge}_z$  layer having a thickness of from about 500 to 25,000Å.

36. (Currently amended) The device of claim [[20]] 33, ~~wherein the strained substrate is comprised of the uppermost strained-Si epi layer over an upper relaxed  $\text{Si}_{1-x}\text{Ge}_x$  layer,~~ where x is no less than y and less than about 0.50, ~~over a graded  $\text{Si}_{1-y}\text{Ge}_y$  layer,~~ where y is no less than z proximate the epi layer and increases to about x proximate the upper relaxed  $\text{Si}_{1-x}\text{Ge}_x$  layer, and ~~over an epi layer over a lowermost relaxed  $\text{Si}_{1-z}\text{Ge}_z$  layer~~ where z is greater than 0 and less than about 0.50.

37. (Currently amended) The device of claim [[20]] 33, wherein the at least one dielectric gate oxide portion being comprised of  $\text{HfO}_2$  or  $\text{HfSiO}_4$ .

38. (Currently amended) The device structure of claim [[20]] 41, wherein the ~~strained substrate further includes a relaxed  $\text{Si}_{1-y}\text{Ge}_y$  layer~~ has having a thickness of from about 200 to 30,000Å, ~~the under the uppermost strained-Si epi layer;~~ a constant  $\text{Si}_{1-y}\text{Ge}_y$  layer has having a thickness of from about 200 to 20,000Å, ~~the under the relaxed  $\text{Si}_{1-y}\text{Ge}_y$  layer;~~ a silicon epi layer has having a thickness of from about 20 to 500Å, ~~the under the constant  $\text{Si}_{1-y}\text{Ge}_y$  layer;~~ and a constant  $\text{Si}_{1-z}\text{Ge}_z$  layer has having a thickness of from about 200 to 20,000Å, ~~under the silicon epi layer;~~ and the uppermost strained-Si epi layer has having a thickness of from about 20 to 500Å.

39. (Currently amended) The device structure of claim ~~[[20]]~~ 41, wherein the ~~strained substrate further includes a relaxed~~  $\text{Si}_{1-y}\text{Ge}_y$  layer has having a thickness of from about 300 to 5000 Å, ~~the under the uppermost strained-Si epi layer;~~ a constant  $\text{Si}_{1-y}\text{Ge}_y$  layer has having a thickness of from about 300 to 5000 Å, ~~the under the relaxed~~  $\text{Si}_{1-y}\text{Ge}_y$  layer; a silicon epi layer has having a thickness of from about 50 to 300 Å, ~~the under the constant~~  $\text{Si}_{1-y}\text{Ge}_y$  layer; and a constant  $\text{Si}_{1-z}\text{Ge}_z$  layer has having a thickness of from about 300 to 5000 Å, ~~under the silicon epi layer;~~ and the uppermost strained-Si epi layer has having a thickness of from about 50 to 300 Å.

40. (Currently amended) The device structure of claim ~~[[20]]~~ 41, wherein the at least one dielectric gate oxide portion is comprised of  $\text{HfO}_2$  or  $\text{HfSiO}_4$ .

41. (Currently amended) ~~The structure of claim 20;~~ At least one high-k device, comprising:  
a structure having a strained substrate formed thereover, the strained substrate comprising  
an uppermost strained-Si epi layer, wherein the strained substrate further includes a relaxed  $\text{Si}_{1-y}\text{Ge}_y$  layer under the uppermost strained-Si epi layer~~[[;]]~~, a constant  $\text{Si}_{1-y}\text{Ge}_y$  layer under the relaxed  $\text{Si}_{1-y}\text{Ge}_y$  layer~~[[;]]~~, a silicon epi layer under the constant  $\text{Si}_{1-y}\text{Ge}_y$  layer~~[[;]]~~, and a constant  $\text{Si}_{1-z}\text{Ge}_z$  layer under the silicon epi layer~~[[;]]~~, wherein the uppermost relaxed-Si epi layer is comprised of  $\text{Si}_{1-x}\text{Ge}_x$  wherein x is constant or graded;  
at least one dielectric gate oxide portion over the strained substrate, the at least one dielectric gate oxide portion having a dielectric constant of greater than about 4.0; and  
a device over each of the at least one dielectric gate oxide portion to complete the at least one high-k device.